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Spring 1-1-2021

**A half-yearly newsletter of the Department of Mechatronics v1 s2
[Jan 2019]**

Chandrashekhar Bhat

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MECHATRON

*A half-yearly newsletter of the Department of Mechatronics
Manipal Institute of Technology
Manipal Academy of Higher Education, Manipal*

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Vision

Excellence in Mechatronics Education through Innovation and Team Work

Mission

Educate students professionally to face societal challenges by providing a healthy learning environment grounded well in the principles of Mechatronics engineering, promoting creativity, and nurturing teamwork

Program Specific Outcomes

At the end of the course the student will be able to

1. Apply the knowledge of sensors, actuators, controls, mechanical design and modern software tools to integrate a system for performing specified tasks
2. Articulate design, modelling, analysis and testing of Mechanical products, systems and controllers using appropriate technology and software tools.

Program Educational Outcomes

The Mechatronics graduates:

1. PEO1: Are expected to apply analytical skills and modelling methodologies to recognize, analyse, synthesize and implement operational solutions to engineering problems, product design and development, and manufacturing.
2. PEO2: Will be able to work in national and international companies as engineers who can contribute to research and development and solve technical problems by taking an initiative to develop and execute projects and collaborate with others in a team.
3. PEO3: Shall be capable of pursuing higher education in globally reputed universities by conducting original research in related disciplines or interdisciplinary topics, ultimately contributing to the scientific community with novel research findings.
4. PEO4: Are envisioned to become technology leaders by starting companies based on social demands and national needs.
5. PEO5: Shall develop flexibility to unlearn and relearn by being in pursuit of research and development, evolving technologies and changing societal needs thus keeping themselves professionally relevant.

Program Outcomes

The POs are exemplars of the attributes expected of a graduate of an accredited programs.

PO 1- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2- Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5- Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6- Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10- Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Message from Department Chair



Dr: Chandrashekhar
Bhat

I take this opportunity to wish all a Happy and Prosperous New Year. I am ecstatic to present the latest issue of Mechatron our department's E-Newsletter.

With many activities happening in Department, this semester was fruitful in terms of academic and research advancements.

With new faculties from different domain joining-in and bringing fresh energy, Department is poised to its maintain its burgeoning growth across disciplines.

THE DEPARTMENT NEWS

EMPOWERING ROBOTICS EMBEDDED TECHNOLOGY THROUGH HANDS ON EXPERIENCE- THE E-YANTRA LAB

e-Yantra is a task based training and task based challenge organized by IIT Bombay and MHRD. The objective is to provide hands-on learning to students and faculties who have limited access to labs and mentors. The goal is to create the next generation of Embedded systems Engineers in India with a practical outlook to take on challenging problems in Robotics and provide solutions.

A two months training was initiated towards training of teachers using task based exercises. A total of six tasks and each task consists of two sub exercises was assigned to the faculties to complete on or before 31st December 2018 from the date of TBT workshop conducted at Bangalore 2018.

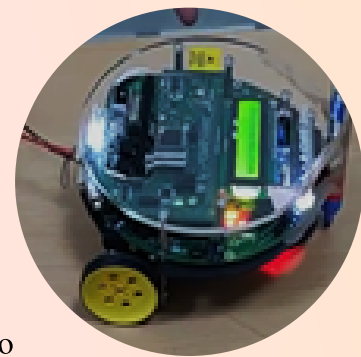
Task1: Introduction to Embedded C and Atmel Studio 6.0.

Task2: I/O interfacing on AVR based microcontrollers.

Task3: Interfacing LCD for debugging.

Task4: Introduction to timers and delay generation.

Task5: DC motor control and PWM generation for velocity control.



After completion of Task based training, a challenge was initiated to program robot with certain specifications for automated parking valet for car in a residential area. A design was sent from e-Yantra team and team was asked to print as a vinyl flex which holds certain flags and boxes representing as barriers and vehicles respectively. The robot is supposed to be programmed as per the configurations and make it a black line follower to detect the vacant spaces and park itself after completion of entire scan.



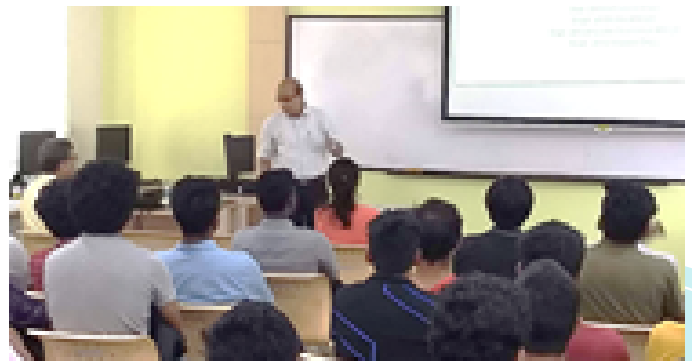
Results of TBT Challenge:

Department of Mechatronics Engineering, MIT Manipal, has scored 1228 points out of 1330 in task based training challenge. As per the qualification categories, the team has qualified under “Eligible for Merit Certificate”. A new lab on this has been setted up.

Guest Lecture

Design and Control of Hand Exoskeletons using a Brain Computer Interface

A Guest lecture by Department of Mechatronics on 19th of October 2018. Dr. Ashish Dutta was the keynote speaker is a professor at Department of mechanical engineering, IIT-Kanpur.



Publications

Mrs Pooja Nag and Mr DAP Prabhakar authored a Research Paper **A Cardio pulmonary resuscitation device for stretchers** under **International Journal of Engineering & Technology**

Mr Raghunandana K was corresponding author in **Model of Excellence for the young self-financing Engineering colleges in India: Faculty Member Perspective** under **Quality Access to Success**

Mr Raghunandana K co-authored a Research Paper **Power loss analysis in altered tooth-sum spur gearing** under **MATEC Web of Conferences**

Mrs Maitri co-authored a Research Paper **Performance Analysis of Isolated Speech Recognition System Using Kannada Speech Database** under **Journal SCIENCE & TECHNOLOGY PERTANIKA**

Mrs Sherine Jesna co-authored a Research Paper **Performance Design of LQR controller for Ballbot and hardware implementation** under **International Conference on Information Technology and Electrical Engineering (ICITEE), Phuket, Thailand ©2017 IEEE**

New MOU

MAHE through the Department of Mechatronics Engineering signed MoU with BOSCH Rexroth for Academic and Industrial Co-operation.



The Big step towards PhD

Few Faculties went to pursue their PhD study to different esteemed colleges.



Mrs Sherine Jesna
Institution: University of Auckland



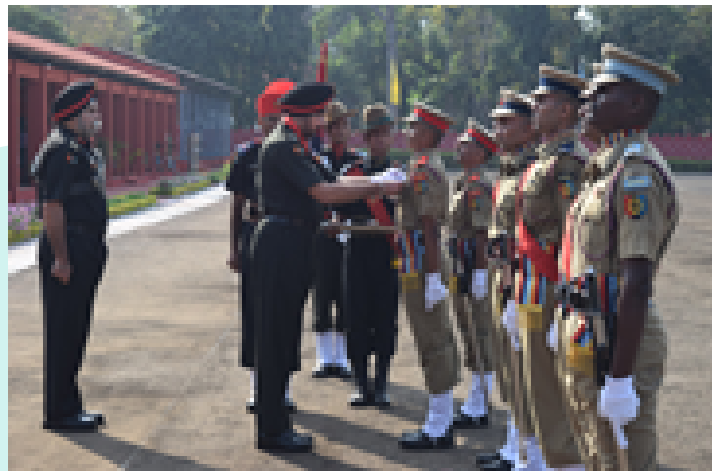
Mr Yedukondala Rao Veeranki
Institution: IIT Madras

FACULTIES CORNER

Commandant's Silver Medal

Lt. Dundesh S. Chiniwar, have successfully completed the pre-commission (PRCN) course held at National Cadet Corps Officer Training Academy (NCC OTA), Kamptee, Maharashtra. The course was conducted from 26th November 2018 to 23rd February 2019. He is commissioned as Lieutenant in NCC Army wing and is inducted as Associate NCC officer (ANO) in NCC.

He was also awarded with the "Commandant's Silver medal" for securing overall second position under senior division category in this course.



Newly appointed faculties



Mr. Munendra Sigh
M.Tech (Instrumentation)
PhD (Submitted : Image Processing)



Mr. Mahesh Inamdar
M.Tech (Industrial
Automation And Robotics)



Dr. Kshetrimayum Lochan
M.Tech (E&C)
PhD (Control and Industrial
Automation)



Dr. Vijay Babu Koreboina
M.Tech (Power Electronics)
PhD (Electrical Engineering)



Ms. Pratibha Vishnu Shinde
M.Tech (Mechatronics and Robotics)



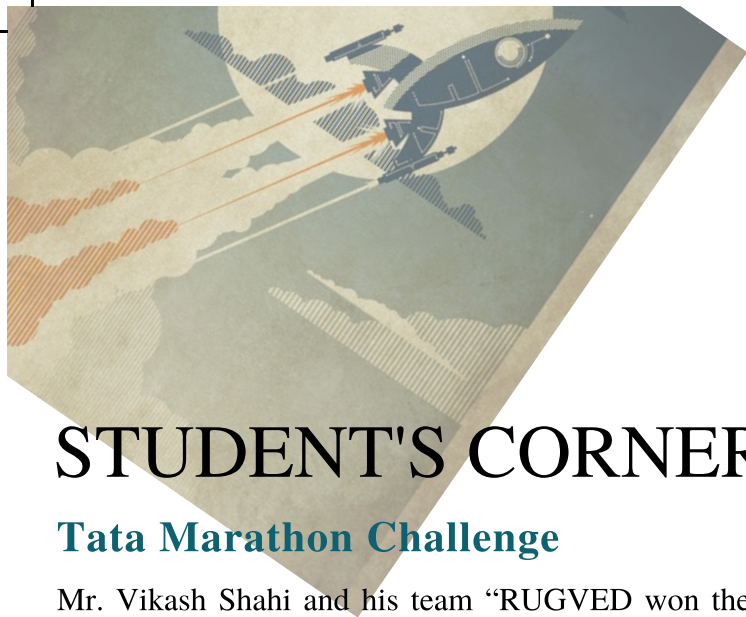
Mr. Dadi Ravi Kanth
M.Tech (Mechatronics)



Ms. Soumya
M.Tech (Mechatronics)
PhD (Submitted : Multi-agent
system inspired distributed
control of manipulaor)



Ms. Dolly Sharma
M.Tech (VLSI &
Embedded System Design)



STUDENT'S CORNER

Tata Marathon Challenge

Mr. Vikash Shahi and his team “RUGVED won the Tata Makerthon Challenge 2018 at Techfest, IIT Bombay on 14/12/2018. The team designed an Object Detection System for Drones, which was able to take image of an object through a Mobile Phone App, send across to the Computer Vision Board for processing and then used the Drone’s Camera gimbal to do a 360 search for the object.

Inter Collegiate Volleyball Tournament

Mr. Aakanksh Mody secured 2nd place in MAHE Intercollegiate Table tennis Tournament on 26th of September 2018.

Familiarization Course

Mr: Karthik Rao completed a course on Familiarization of Telecom Technology awareness course conducted by BSNL in Mangalore from 18-22 Dec 2017

PUBLICATIONS AND PATENT

Mr. D.N. Harshith has published a journal on “Optimized ANN-GA and experimental analysis of the performance and combustion characteristics of HCCI engine” high impact factor journal of Q1 quartile.

Mr. Zorawar has filed patent on “Vertical /short takeoff and landing delta wing aircraft with thrust producing elements within the air frame”.

Triathlon 2019

Ms. Shrinidhi Urala has secured first position in the triathlon held by RedX in which she accompanied the task in 18.26 minutes.

Rank Holders

Second Year - (CGPA) Third Year - (CGPA)

Avneesh Mishra - 9.98

Sourav Mishra - 9.38

Chunduru Bharath - 9.68

Khushi Goenka - 9.25

Surya Palaniswamy - 9.48

Shrinidhi Bhat - 9.24

M.Tech (Industrial Automation and Robotics)

Ajeya B - 9.66

Dhanush G Ballal - 8.98

Chetan Kumar – 8.86

Initiation of New Curriculum Revision

Department of Mechatronics department abide to principle of bridging the gap between academia and industry, wherein faculties and subject experts regularly sit and discuss about topics to inculcate or omit in syllabus in order to prepare students for future and societal challenges.

Following this, after completion of four academic years faculties designed new curriculum, which is intended to enhance subject and practical knowledge.

Year	THIRD SEMESTER					FOURTH SEMESTER						
	Sub. Code	Subject Name	L	T	P	C	Sub. Code	Subject Name	L	T	P	C
II	MAT 2151	Engineering Mathematics – III	2	1	0	3	MAT 2261	Engineering Mathematics – IV	2	1	0	3
	MTE 2151	Data Structures and Algorithms	2	1	0	3	MTE 2251	Automated Manufacturing Systems	3	0	0	3
	MTE 2152	Digital System Design	3	1	0	4	MTE 2252	Design of Machine Elements	3	1	0	4
	MTE 2153	Microcontroller based System Design	4	0	0	4	MTE 2253	Linear Control Theory	3	1	0	4
	MTE 2154	Robotics I	2	1	0	3	MTE 2254	Linear Integrated Circuits and Applications.	3	1	0	4
	MTE 2155	Sensors and Instrumentation	4	0	0	4	*** ****	Open Elective – I				3
	MTE 2161	Microcontroller Lab	0	0	3	1	MTE 2261	CAD and Kinematics' Simulation Lab	0	0	3	1
	MTE 2162	Robotics Lab I	0	0	3	1	MTE 2262	Integrated Electronics Lab	0	0	3	1
	MTE 2163	Sensors and PLC lab	0	0	3	1	MTE 2263	Manufacturing Processes Lab	0	0	3	1
Total Contact Hours (L + T + P)			30			Total Contact Hours (L + T + P) + OE			27 + 3 = 30			
III	FIFTH SEMESTER					SIXTH SEMESTER						
	HUM 3051	Engg Economics and Financial Management	2	1	0	3	HUM 3052	Essentials of Management	2	1	0	3
	MTE 3151	Digital Signal Processing	3	1	0	4	MTE 3251	Automobile Engineering	2	1	0	3
	MTE 3152	Electric Drives	3	1	0	4	MTE 3252	Energy and Heat Transfer	3	1	0	4
	MTE 3153	Hydraulics and Pneumatics Systems	2	1	0	3	MTE 3253	Program Elective – I	3	0	0	3
	MTE 3154	Theory of Machines	3	1	0	4	MTE 3254	Program Elective – II	3	0	0	3
	*** ****	Open Elective – II				3	*** ****	Open Elective – III				3
	MTE 3161	Drives, Controls and Modelling Lab	0	0	6	2	MTE 3261	Hydraulics Lab	0	0	3	1
	MTE 3162	Robotics Lab II	0	0	3	1	MTE 3262	IIoT Lab	0	0	6	2
						MTE 3263	Pneumatics Lab	0	0	3	1	
Total Contact Hours (L + T + P) + OE			27 + 3 = 30			Total Contact Hours (L + T + P) + OE			28 + 3 = 31			
IV	SEVENTH SEMESTER					EIGHTH SEMESTER						
	MTE ****	Program Elective – III	3	0	0	3	MTE 4298	Industrial Training				1
	MTE ****	Program Elective – IV	3	0	0	3	MTE 4299	Project Work/Practice School				12
	MTE ****	Program Elective – V	3	0	0	3	MTE 4296	Project Work (Only for B. Tech. Hons.)				20
	MTE ****	Program Elective – VI	3	0	0	3						
	MTE ****	Program Elective – VII	3	0	0	3						
*** ****	Open Elective – IV				3							
Total Contact Hours (L + T + P) + OE			15 + 3 = 18									

Electives

Minor Specialization		
<p>I. Electric Vehicle Technology MTE 4051: Automotive Control Systems MTE 4052: Battery and Fuel Cell Technology MTE 4053: Mechatronics modelling of Hybrid Vehicles MTE 4054: Vehicle Dynamics</p> <p>II. Industrial IoT Systems MTE 4055: Database Management Systems MTE 4056: Information Security for Industrial Automation MTE 4057: Internet Working for Industries MTE 4058: Principles of Cryptography</p> <p>III. Robotics and Automation MTE 4059: Artificial Intelligence MTE 4060: Robot Dynamics and Control MTE 4061: Robot Path Planning and Mobile Robots MTE 4062: Soft Robotics</p> <p>IV. Business Management HUM 4051: Financial Management HUM 4052: Human Resource Management HUM 4053: Marketing Management HUM 4054: Operation Management</p>	<p>V. Computational Mathematics MAT 4051: Applied Statistics and Time Series Analysis MAT 4052: Computational Linear Algebra MAT 4053: Computational Probability and Design of Experiments MAT 4054: Graphs and Matrices</p> <p>VI. Material Science PHY 4015: Physics of Low Dimensional Materials PHY 4052: Physics of Photonic & Energy Storage Devices CHM ****: Chemical Bonding CHM ****: Chemistry of Carbon Compound</p> <p>Other Electives MTE 4063: Big Data Analytics MTE 4064: Building Automation MTE 4065: Computer Architecture and Real time Systems MTE 4066: Computer Networks and Communication Protocols MTE 4067: Design of Mechanical Drives MTE 4068: Dynamics and Controls of Mechatronics Systems MTE 4069: Electric Vehicle Machines and Drives MTE 4070: Embedded Systems and RTOS MTE 4071: Engineering Materials</p>	<p>MTE 4072: Hybrid Vehicle Technology MTE 4073: Machine Learning MTE 4074: Machine Tool Technology MTE 4075: Machine Vision and Image Processing MTE 4076: Mechanical Vibrations MTE 4077: Micro Electro Mechanical Systems MTE 4078: Micro-manufacturing Systems MTE 4079: Nanotechnology MTE 4080: Production Operations and Management MTE 4081: Robotics II MTE 4082: Systems Modelling and Simulation MTE 4083: Wireless Sensor Networks</p> <p>Open Electives MTE 4301: Autonomous Robots MTE 4302: Electric Vehicle Technology MTE 4303: Hydraulics and Pneumatics Systems MTE 4304: Industrial IoT MTE 4305: Introduction to Robotics MTE 4306: Mechatronics Systems</p>

International Students

As of Dec 2018, there are five International Students under various faculties working on project of different domains. As we always strive to keep principle of interdisciplinary intact, hence we get students of different departments every year.



PETR CLINK (CZECH REPUBLIC)

WORKED UNDER :- MR. VIJAY K PANDEY

PROJECT: BALANCE A SINGLE WHEEL USING GYROSCOPIC SENSOR AND THEN TO CONTROL THE MOTION

MARIJA MILIČEVIĆ (BOSNIA)

WORKED UNDER :- MR. SHASHANK PANSARI

PROJECT: DEVELOPMENT OF SOFTWARE TOOLS FOR AUTOMATIC ALLOCATION OF OPTIMAL MACHINING PARAMETERS FOR CAD MODELS



LUKAS HOBER (AUSTRIA)

WORKED UNDER :- MR. SHASHANK PANSARI

PROJECT: MATLAB PROGRAMMING FOR AUTOMATED OPTIMIZATION OF SINGLE/MULTI OBJECTIVE APPLICATIONS

YIĞIT TAŞKIN (TURKEY)

WORKED UNDER :- MR. YKR RAO

PROJECT:



MICHEAL EHINGER (GERMANY)

WORKED UNDER :- MR. VIJAY K PANDEY

PROJECT: CONTROL OF ARISTO XT 6 AXIS ROBOT MTAB

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